Respected Madam,

Thank You for giving time to my theory. I have to make slight modifications in it. Basically, i have to justify the reason for using differential support. So i would like to make a point that in this theory

"for a union of two itemsets X and Y, to predict the frequent-ness of the resulting set we use the following features:

1) Minimum Support threshold provided by user

2) Virtual Support Count: it is the support count of an itemset calculated by applying differential technique to the Actual support count of its subsets.

3) Minimum Differential support: is the differential support count, which is used as a standard for comparison with sum of differential support counts of individual itemsets being unioned. It is by
convention put equal to Minimum Support threshold (exhibits symmetry) but can also be user specified
(will not exhibit symmetry, here symmetry is reflected by the fact that both the actual and virtual support counts are compared with thresholds of same value).

4) Differential Support: is the difference of Virtual Support and Minimum Support threshold.

::Theory::
So for two itemsets X and Y getting unioned, the resultant set is said to be frequent if:

~~~Condition 1: Differential Support of both itemsets X and Y is positive and greater than zero, i.e.
DVS(X) >0 && DVS(Y) >0

// It is another form of saying that Virual Support of X and Y must be individually greater than Minimum
// support threshold. -- DVS(X) = Vsup - sigma.
// Therefore, DVS(X) >0 => Vsup(X) - sigma >0 => Vsup(X) > sigma, which is what we normally do.

~~~Condition 2: Sum of Differential Support Count of both itemsets X and Y, to be unioned, must be greater than Minimum Differential threshold, i.e.

DVS(X) + DVS(Y) > MinDVS*

* by convention Min DVS equals to Min Support threshold to maintain symmetry in prediction technique for all kinds of itemsets, because for 1-itemsets we use Minimum support thresholds and for rest we use Minimum differential thresholds.

So if the above two conditions are satisfied then the set resulting from union of X and Y, WILL BE FREQUENT.

And since we are not actually calculating the support count of the resulting set by scanning the database, we evaluate its Virtual support count, which is the sum of differential support counts of individual itemsets or minimum of virtual support counts of individual itemsets, whichever is lesser, i.e.

Vsup (X U Y) = DVS (X) + DVS (Y) iff DVS (X) + DVS (Y) < Min (DVS (X) , DIV (Y))
Min (DVS (X), DVS (Y)) iff DVS (X) + DVS (Y) >= Min (DVS (X) , DIV (Y))

where Vsup(F) is the virtual support of itemset F.

###The reason we use Virtual support instead of Actual support is that,

To calculate Actual support of an itemset, you waste considerable time scanning database , transaction by transaction, thus I/O limits the time efficiency.

Whereas To calculate Virtual Support of an itemset, you just use CPU time for computation and NO I/O!!!!
which is very less.

Also in all other algorithms we waste a lot of space storing the resultant itemset from the union of two itemsets and then calculate its actual support (I/O), which may or may not be frequent.

Where as in this algorithm,we just check the sum of differential supports of each combination, which is already saved in the main memory (after previous computations) and occupies very less space (Imagine storing just the differential count or storing a complete resultant itemset + its support count).

Thus our algorithm is very Time and Space efficient.
The striking feature is : You predict almost 80% of all frequent sets predicted by any other algorithm by making just 2 database scans (which is irrespective of size of database and no. of items!!!) and by using hardly any space as compared to any other algorithm (As we use no complex data structures like MFCS or MFS or FP-tree or DIC itemsets or partitioned database).

Madam, if u find the theory convincing enough and punchy then i can go forward in completing my paper using it. I shall further enhance the theory and support it with more justifications and reasoning. I will bring my paper on monday, updated if u tell me any more changes during the weekend.

Waiting for your reply.
With warm regards
Akash